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# **HR in dynamic environments: Exploitative, exploratory and ambidextrous HR architectures**

*Nina Katrin Hansen<sup>1</sup>, Wolfgang H. Güttel<sup>2</sup> & Juani Swart<sup>3</sup>*

## **Abstract**

The current economic crisis has brought to the fore the need for firms to deal with ambiguity and complexity. Hence, firms need a specific balance between exploration and exploitation in order to keep pace with varying and changing environmental conditions. Hitherto, there is limited research that has examined the nexus of HR architectures, ambidexterity, and environmental dynamics. In this conceptual paper we ask: *How do HR architectures serve as a means of balancing exploitative and exploratory learning in different dynamic environments?* We explain how exploratory, exploitative, and ambidextrous HR architectures with their embedded HRM systems and practices enable organizations to meet different environmental requirements. Thus, firms in which heterogeneous demands for flexibility and for innovation co-exist need to develop internally differentiated HR architectures. In particular we elucidate how critical the organization's ability is to connect different HRM systems to create an ambidextrous HR architecture for finding an appropriate balance between exploration and exploitation.

*Keywords:* Ambidexterity; HR Architecture; HRM Systems; Environmental Dynamics; Exploration; Exploitation

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## **Abstract**

The current economic crisis has brought to the fore the need for firms to deal with ambiguity and complexity. Hence, firms need a specific balance between exploration and exploitation in order to keep pace with varying and changing environmental conditions. Hitherto, there is limited research that has examined the nexus of HR architectures, ambidexterity, and environmental dynamics. In this conceptual paper we ask: *How do HR architectures serve as a means of balancing exploitative and exploratory learning in different dynamic environments?* We explain how exploratory, exploitative, and ambidextrous HR architectures with their embedded HRM systems and practices enable organizations to meet different environmental requirements. Thus, firms in which heterogeneous demands for flexibility and for innovation co-exist need to develop internally differentiated HR architectures. In particular we elucidate how critical the organization's ability is to connect different HRM systems to create an ambidextrous HR architecture for finding an appropriate balance between exploration and exploitation.

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## **Introduction**

Ambiguity and uncertainty cause firms to reflect upon their current capabilities, markets, and business models in order to carefully balance exploitation and exploration. Firms compete in environments with different dynamics and consequently require - based on their specific strategy - an idiosyncratic balance between exploration and exploitation (Benner and Tushman 2002, 2003). For instance, the internet giant Google needs an HRM system that facilitates exploration in order to remain successful in this fast-paced market, whereas the success of low-cost airline Ryanair depends on the strict exploitation of its existing business model. However, sometimes firms act in high-velocity markets and in moderately dynamic markets concurrently (e.g. Apple with its iPads and Mac computers). Thus, such firms require different learning modes for both environments simultaneously and have to balance and integrate heterogeneous learning streams at the same time (O'Reilly and Tushman 2008, Raisch, Birkinshaw, Probst and Tushman 2009). HR architectures substantially contribute to meet these heterogeneous demands. Thus, in order to survive in a dynamic and competitive landscape, firms need to improve flexibility and stimulate innovation by utilizing their resource base (e.g. Lengnick-Hall, Beck and Lengnick-Hall 2011, Li and Liu 2014, Wu 2010). The implementation of an effective HR architecture (see e.g. Jiang, Lepak, Han, Hong, Kim and Winkler 2012), which enables the balance between efficiency and innovation has not been considered in detail in previous studies.

The above indicates that the various requirements for exploiting existing resources and for exploring new opportunities with regard to HR architectures need to be thoroughly discussed. However, the nexus between HR architectures and ambidexterity in different dynamic environments remains theoretically fragmented and underdeveloped at present, and, therefore, needs further conceptual and empirical

clarification. Although this topic has recently received increasing attention (e.g. Kang and Snell 2009, Prieto and Pérez Santana 2012, Patel, Messersmith and Lepak 2013, Ahammad, Lee, Malul and Shoham 2015, Garaus, Güttel, Konlechner, Koprax, Lackner, Link and Müller 2015, Glaister, Ahammad and Junni 2015, Kostopoulos, Bozionelos and Syrigos 2015, Junni, Sarala, Tarba, Liu and Cooper 2015), an analysis of the current state of the field shows that only a few articles examine the role of this important link and that a unifying framework is still missing at this point (Junni et al. 2015).

In view of this, in the present paper we examine the role of HR architectures to maintain exploration and exploitation that enable a firm to reconfigure its resource base so that it can match the demands of different dynamic environments. To that end, we pose the following research question: *How do HR architectures serve as a means of enabling an appropriate balance of exploration and exploitation in different dynamic environments?*

By analyzing how HRM systems influence exploration and exploitation, we contribute to current HRM research in three ways: *first*, we develop an overall theoretical framework whereas previous work only has discussed parts of the question of how different combinations of HRM systems enable exploitation, exploration and ambidexterity in different environmental settings. Research on the interface between ambidexterity, exploration, and exploitation and HR architectures and HRM systems is scarce. Hitherto, instead of an integrative framework as to how different HR architectures serve as a means for keeping pace with different dynamic environments, only a few studies show how HR architectures and systems are useful in turbulent and complex environments (e.g. Huang and Kim 2013) or in a crisis (e.g. Nijssen and Paauwe 2012). We explain how different HR architectures, as specific combinations of

HRM systems, create an appropriate balance between exploration and exploitation necessary to keep pace with different dynamic environments. Hitherto, ambidexterity literature is not fully differentiated under which environmental conditions different HR architectures are useful and how specific HR architectures contribute to exploration and exploitation respectively.

*Second*, we advance Lepak and Snell's model of the HR architecture (1999, 2002) by integrating the dimension of environmental dynamics to explain how differently designed HRM systems can help a firm's adaptation to environments with different dynamics. Therefore, we extend the internal perspective of the HR architectures, which focuses primarily on organizational resources, by considering the organization's environment as a central determinant of a firm's survival and success.

*Third*, we indicate the need for internally differentiated HR architectures for those firms in which heterogeneous demands for efficiency and radical innovation co-exist, which is typical for some ambidextrous firms (Nosella, Cantarello and Filippini 2012, Tushman and O'Reilly 1996, Raisch and Birkinshaw 2008). In this way, we respond to Lepak and Shaw's call (2008) for further research on internally differentiated HR architectures, which are in particular necessary to achieve ambidexterity.

To answer our research question, we will proceed in the following way: First, we will discuss the current research on HR and organizational ambidexterity. Second, we explain the characteristics of different environmental dynamics (high-velocity, moderately dynamic and ambidextrous environments). Third, we illustrate how specific HRM systems (commitment, productivity, compliance and collaborative) enable exploitation, exploration and (structurally vs. contextually) ambidexterity in each environmental setting. We conclude by discussing our theoretical framework and its

contributions against the backdrop of existing studies and highlight areas for future research and outline important managerial implications.

### **Exploration, Exploitation, Ambidexterity and HRM**

Organizations need to rely on their existing capabilities while exploring new opportunities in order to remain competitive. March (1991) introduced two possibly competing modes of organizational learning. *Exploitation*, involving ‘refinement, choice, production, efficiency, selection, implementation, execution’ (1991, p. 71) and *exploration*, characterized by ‘search, variation, risk taking, experimentation, play, flexibility, discovery, innovation’ (1991, p. 71). It sets up a need for flexibility and innovation if, as March (1991) suggests, these two activities compete for finite resources. Ambidexterity has emerged as the central research stream in trying to answer how to simultaneously pursue the antagonistic learning modes of exploration and exploitation (e. g. Tushman and O’Reilly 1996, Simsek, Heavey, Veiga and Souder 2009, Raisch and Birkinshaw 2008, O’Reilly and Tushman 2013): ‘Organizational ambidexterity (OA) refers to the ability of an organization to efficiently take advantage of existing market opportunities while creating and innovating to meet the challenges of future markets’ (Patel et al. 2013, p. 1420).

Exploration and exploitation have become ‘umbrella’ terms to address antagonistic logics within organizations (Gupta, Smith and Shalley 2006). In ambidexterity research, literature streams discuss the balance of exploration and exploitation from an organizational perspective and from an innovation perspective (Raisch and Birkinshaw 2008). Güttel et al. (2015) elucidate that the exploration/exploitation-dichotomy concerns both innovation management (‘innovator’s dilemma’) and organizational context (‘productivity dilemma’).

Researchers in the field of innovation management use the exploration/exploitation-differentiation to distinguish between radical (exploratory) and incremental (exploitative) innovations in new product development processes or other innovation projects (e.g. Benner and Tushman 2002; Sidhu, Commandeur and Volberda 2007). Radical innovations seek to create completely new solutions based on new knowledge and on distal search. Incremental innovations are small improvements within the existing frame of reference, based on a recombination or refinement of existing knowledge and on local search. In this vein, ambidexterity strives to balance different innovation streams (O'Reilly and Tushman 1996) in order to avoid success traps (O'Reilly and Tushman 2008) and to overcome the innovator's dilemma (Christensen 1997).

The exploration/exploitation-dichotomy is also used on an organizational level to differentiate between adaptability (exploration) and alignment (exploitation) (Gibson and Birkinshaw, 2004). Firms always need to find an appropriate balance between efficiency, standardization, and replication, on the one hand, and flexibility, improvisation, and renewal, on the other. On the organizational level, ambidexterity refers to the simultaneity of activities that are directed towards alignment and adaptability and, therefore, paves the way for resolving the productivity dilemma that deals with this tension (Adler, Benner, Brunner, MacDuffie, Osono, Staats, Takeuchi, Tushman and Winter 2009).

Therefore we distinguish between exploration, exploitation, and ambidexterity according to the need for flexibility (alignment vs. adaptability; Gibson and Birkinshaw 2004) and the need for innovation (incremental vs. radical; Tushman and O'Reilly 1996, Andriopoulos and Lewis 2009, Benner and Tushman 2002) (figure 1). Exploitation refers to a low level of flexibility, i.e. alignment, and the search for incremental



innovation. Exploration is characterized by a high level of flexibility, i.e. adaptability, and the attempt to facilitate radical innovation. Ambidexterity seeks to find an appropriate balance between exploration and exploitation.

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Insert Figure 1 about here  
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The current literature suggests three major approaches to achieve ambidexterity (Turner, Swart and Maylor 2013); i.e., structural ambidexterity (O'Reilly and Tushman, 2004), wherein exploitation and exploration take place in different departments or business units; secondly, contextual ambidexterity (Gibson and Birkinshaw 2004), which is 'the behavioral capacity to simultaneously demonstrate alignment [exploitation – meeting defined goals] and adaptability [exploration - reconfiguration as required at that moment in time] across an entire business unit' (2004, p. 209), and thirdly, temporal ambidexterity (Tushman and O'Reilly, 1996), where exploitation and exploration vary across time. More recently Zimmerman, Raisch and Birkinshaw (2015) explored the preceding notion wherein an organization decides to adopt an ambidextrous orientation, known as the charter definition process, which is followed by the charter execution process. The authors' indicate that this can be done via both a top-down and a bottom-up approach. This research indicates that there are constant tensions between the exploratory and exploitive orientations, which would require flexibility. Nevertheless, in many markets firms profit from exploiting existing capabilities, as replicating companies do (e.g. McDonalds, Starbucks), by adapting an exploitative design. Whereas in some niches, organizations seek to use an exploratory design in

order to work on disruptive innovations (e.g. CERN, Lockheed Martin's skunk work projects).

Recent works in the field of Human Resource Management research discuss HRM systems as the basis of exploration, exploitation, and ambidexterity. In these works, HRM systems are seen as specific knowledge-governance mechanisms of human capital and organizational capability development as the basis of exploitative and exploratory learning modes (Hansen and Alewell 2013). Furthermore, according to these studies, HRM generates managerial entrepreneurship and supports technological and managerial innovations that can help firms overcome the danger of organizational rigidities (Chadwick and Dabu 2009). It is therefore important for an HRM system to be flexible which Ketkar and Sett (2009) also advise is central to ambidexterity. Empirical studies in this stream of literature show that knowledge-based HRM practices in particular have positive effects on an organization's innovation capabilities and performance outcomes (Lopez-Cabrales, Pérez-Luno and Valle Cabrea 2009, Zhou, Hong and Liu 2013, see also Saá-Pérez and García-Falcón 2002).

Some further recent studies focus on how specific HRM systems (e.g. market-based vs. internal labor markets or high-performance work systems) and corresponding intellectual capital architectures influence ambidexterity and related value creation (e. g. Kang, Morris and Snell, 2007, Kang and Snell 2009, Patel et al. 2013, Kostopoulos et al. 2015). They e.g. analyze how HRM system (market-based vs. high-commitment work systems) and complementary organizational capital enable ambidextrous learning (Kang and Snell 2009). In these works, HR practices are seen as antecedents and systematic tools that underpin and shape exploitative and explorative learning modes and resolve the tensions that potentially arise from concurrent exploration and exploitation (Swart and Kinnie 2010, Patel et al. 2013).

Kang, Morris, and Snell (2007), discuss a) knowledge flows between core knowledge employees and external alliance partners and b) internal traditional employees. Internal cooperation reflects a cooperative relational archetype and is based on structurally dense networks, generalized trust and organization norms. Such relationships integrated into the firm by means of organizational coordination and foster exploitation. These cooperative relationships may be facilitated by HRM systems that encompass ‘(1) interdependent work structures, (2) clan-fostering initiatives, and (3) broad skill development’ (Kang et al. 2007, p. 247). In contrast, knowledge flows between core knowledge employees and external alliance partners reflect an entrepreneurial relational archetype. Relationships are loosely coupled and flexible and based on dyadic trust, personal experience, and expertise as basis of exploration. HRM systems that promote entrepreneurial archetypes are based on ‘(1) flexible work structures, (2) result-based incentives, and (3) transspecialist development’ (Kang et al., 2007, p. 249). Kang and Snell (2009) went on to identify two distinct categories of intellectual capital architecture that facilitate ambidexterity. The first category, ‘refined interpolation’, consists of specialist human capital and cooperative social capital, which further exploitative learning. To further exploratory learning and to enable ambidextrous learning this is combined with organic organizational capital. Refined interpolation is thereby supported by an HRM system that relies on the internal labor market. The second type of architecture, ‘disciplined extrapolation’, is comprised of generalist human capital and entrepreneurial social capital, which facilitate exploratory learning and are complemented by a type of mechanistic organizational capital that fosters exploitative learning and therefore ambidexterity. Disciplined extrapolation can be supported a market-based HRM. The two alternative HRM systems, which support

ambidextrous learning that Kang and Snell identified in their conceptual paper (2009), bring together the discussions on HRM, intellectual capital, and ambidexterity.

Recent empirical studies show that bundles of high-involvement HRM practices indeed have a positive impact on the organization's social climate, which positively influences ambidexterity and thus leads to higher firm performance (Prieto and Pérez Santana 2012). In addition, Prieto-Pastor and Martin-Perez (2015) find that high-involvement HRM systems are positively related to ambidexterity. Yoon and Chae (2012) focus on HRM systems, which are based on market mechanisms for rewards, bureaucratic mechanisms for stability and clan mechanisms encouraging a sense of membership. They incorporate a 'bottom-up' approach, which points to the importance of engaging employees in the attainment of ambidexterity. This echoes the study of Probst, Raisch and Tushman (2011), who illustrated the importance of involvement across levels in order to enact ambidextrous leadership.

HRM practices are found to be less formalized in entrepreneurial HRM systems, which facilitate exploration and support flexibility and improvisation, than in cooperative HRM systems, which facilitate exploitation (Medcof and Song 2013). Tansley, Kirk, Williams and Barton (2014) also find that it is important to balance exploitation and exploration via e-HRM systems; the former is achieved via everyday practices performed by practitioners at all levels in the organization whilst e-HRM exploration is deemed to be more of an accidental. Furthermore, Garaus et al. (2015) found out that mid-sized hidden champions use employment and work practices to facilitate knowledge transmission and to couple exploitative and exploratory domains to achieve organizational ambidexterity and to profit from their market knowledge in RandD. More recently, authors have focused on how HRM systems facilitate specific types of ambidexterity: e.g. how structural ambidexterity is developed through the HR

function (Huang and Kim 2013), and how high-performance work systems enable contextual ambidexterity via alignment (discipline and stretch) and adaptation (support and trust) (e.g. Patel et al. 2013).

To summarize, recent research on HRM systems has shown their role as critical antecedents and their positive impact on ambidexterity, for example, through the implementation of specific HRM bundles like motivation-enhancing HR practices (Ahammad et al. 2015). However, a comprehensive theoretical framework that takes different types of HRM systems and also different types of ambidexterity and pure forms of exploitation and exploration into account does not currently exist. With our overall theoretical framework we furthermore contribute to the even fewer papers that address the role of HRM and environmental dynamics such as to how firm's cope with environmental dynamism (e.g. Halevi, Carmeli and Brueller 2015, Martínez-Del-Río, Céspedeslorente and Carmona-Moreno 2012) and how HRM systems help to achieve organizational agility in turbulent times or in rapidly changing environments (Nijssen and Paauwe 2012, Wang, Jaw and Tsai 2012, Huang and Kim 2013).

### **Exploratory, Exploitative, and Ambidextrous Designs for Different Environmental Conditions**

Eisenhardt and Martin (2000) elucidated as to how different dynamic markets impact the organization's adaptive and innovative behavior. They distinguish between high-velocity and moderately dynamic environments depending on the environment's dynamism and instability. The level of dynamism can thereby be characterized by the rate and the unpredictability of environmental change (Dess and Beard 1984). Environmental instability is defined as extent to which an environment exhibits change (Miller, Ogilvie and Glick, 2006, p. 101). In this connection, Dess and Beard (1984, p.

56) mention turnover, absence of patterns and unpredictability as best measures of environmental stability-instability.

Accordingly, high velocity markets are very dynamic and ‘change becomes nonlinear and less predictable’ (Eisenhardt and Martin, 2000, p. 1111) and market boundaries become ‘blurred, successful business models are unclear, and market players (i.e., buyers, suppliers, competitors, complementers) are ambiguous and shifting’ (ibid.). Therefore, the overall industry structure also becomes unclear and as future states are a priori not definable and uncertainty cannot be modeled in form of probability measures (e.g. RandD-driven markets such as the ICT market or the life-science market). In high-velocity environments firms draw on simple rules that govern adaptation and knowledge creation as coping with uncertainty becomes a major challenge (Eisenhardt and Martin 2000).

In contrast, ‘[m]oderately dynamic markets are ones in which change occurs frequently, but along roughly predictable and linear paths’ (Eisenhardt and Martin 2000, p. 1110). Industry structures are relatively stable so that ‘the market boundaries are clear and the players (e.g., competitors, customers, complementors) are well known’ (ibid.). In moderately dynamic environments (e.g. the retail trade or public administration), firms are therefore more likely to rely on complex routines that help to reconfigure the organization’s knowledge-base.

Differences in environmental dynamics determine the level of complexity that managers and employees have to deal with: complexity increases in situations where individuals cannot draw on existing modes of coping with emerging challenges (Bingham and Eisenhardt 2011, Bingham and Haleblan 2012, Gingerenzer and Gaissmaier 2011). In high-velocity markets, complexity is high because existing decision-making heuristics and cognitive schemata constantly need to be modified so

that firms can deal effectively with new situations. In moderately dynamic markets, where environmental requirements are more predictable and stable, complexity is lower because decision-making heuristics and cognitive schemata do not become obsolete quite as rapidly as in high-velocity markets.

Here we carry the reasoning forward to conceptually discuss how HR architectures help firms to achieve exploration, exploitation, and ambidexterity to meet the demands of different dynamic environments. Depending on different environmental conditions with specific needs for flexibility and for innovation, we distinguish between different designs with specific requirements for HR architectures: exploratory design in high-velocity markets, exploitative design in moderately dynamic markets, and ambidextrous designs in markets with heterogeneous demands both for efficiency and innovation (figure 2).

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The diverse and changing demands of exploratory, exploitative, and ambidextrous designs require a different relationship between exploration and exploitation. *Exploratory designs* strive for adaptability and radical innovation in order to deal with the constantly changing and unpredictable trajectories of market developments and technological trends. In markets with rapidly changing customer trends and constantly emerging business models (e. g. molecular biology, quantum computing) adaptability is necessary even in established companies, which is usually enabled by adopting a project-based structure (such as in bio-tech and ICT companies). In high-velocity

markets firms need to develop more radical innovations in order to overcome established technologies or business models.

*Exploitative designs*, in turn, seek alignment and incremental innovations, given that their development scenarios are more assessable. In more stable environments, an exploitative design needs to enable highly reliable performances (e.g. airlines, hospitals), exactly replicated routines and business models (e. g. McDonalds, Starbucks), or highly predictable decisions (e. g. public administration, courts). Thus, a high level of exploitation is necessary to optimize business processes or replicate best-practice solutions. In moderately dynamic markets, radical innovations might threaten established capabilities and business models. For that reason, the introduction of innovations in firms such as airlines, hospitals, or nuclear power plants typically consists of small incremental improvements.

*Ambidextrous designs* concurrently balance alignment and adaptability (Gibson and Birkinshaw 2004) and incremental and radical innovation (Andriopoulos and Lewis 2009), because they often compete in markets where both efficiency and radical innovation are necessary (pharmaceutical firms, such as Baxter and Novartis, or ICT companies, such as Apple, Samsung, and IBM, are examples of ambidextrous firms).

### **Exploratory, Exploitative, and Ambidextrous HR Architectures for Different Environmental Conditions**

The utilization of existing capabilities and current market opportunities can be facilitated through *exploitation*, which can be related to an efficiency perspective in HRM research that highlights the importance of the vertical and horizontal fit of HRM systems (Wright and Snell 1998). In contrast, *exploration* can pave the way for new capabilities and organizational opportunities and can be associated with a *flexibility*



perspective in HRM (Barney and Wright 1998). The concept of flexibility highlights the fact that organizations have to cope with complex and rapidly changing environments: 'From this perspective, strategic HRM is concerned primarily with developing the organizational capability to adapt to changing environmental contingencies' (Wright and Snell 1998, p. 756, with reference to Snell, Youndt and Wright 1996). Flexibility can be defined as 'a firm's ability to quickly reconfigure resources and activities in response to environmental demand' (Wright and Snell 1998, p. 758). Different employee groups and related HRM subsystems in the HR architecture provide a firm with different types of flexibility: core knowledge employees are able to perform a wide variety of tasks and, therefore, generate *resource flexibility* (Lepak and Snell 2008, p. 225). Resource flexibility enables organizations to reconfigure and adjust the tasks employees have to perform in order to adapt to changing circumstances. Firms require in particular in high-velocity environments such resource flexibility. Organizations may also cope with unexpected environmental changes, which require *coordination flexibility* (Lepak, Takeuchi and Snell 2003). It is 'the ability to adjust the number and types of skills in use' (Lepak and Snell 2008, p. 225). Contract-based employment allows firms to adjust the size and skills of the workforce by hiring external or contingent employees, who perform specific tasks for a limited period of time (Lepak, et al. 2003). In stable environments, however, where performance demands are easier to predict, resource and coordination flexibility are less significant. In such environments an HRM system that relies on job-based employment and in which employees perform pre-specified tasks may be more effective (Lepak et al. 2003).

In this context, Wright and Snell (1998, p. 758) propose a 'complementary' perspective (Miliman et al., 1991), according to which fit and flexibility and exploitation and exploration can coexist in a firm. In a recent empirical study, Patel et

al. (2013) discuss how High Performance Work Systems, on the one hand, include HR practices that facilitate alignment of employee behavior with organizational goals via the creation of 'discipline and stretch' (necessary for exploitation) and, on the other hand, encompass HRM practices that enable adaptation of existing employee behavior through the creation of support and trust (necessary for exploration). Nijssen and Paauwe (2012) emphasize that organizational work practices are seen as important determinants of an organization's agility in institutional settings that demand strategic responses and of its ability to survive in the dynamic environment of an economic crisis. Huang and Kim (2013) highlight the role of HRM in creating structural ambidexterity to keep pace with environmental demands. However, despite these few studies, it still remains unclear how exactly HRM architectures with embedded HRM systems and practices contribute to exploration, exploitation and ambidexterity for matching different environmental demands.

We therefore apply Lepak and Snell's (1999, 2002) work on the HR architecture because it draws an 'overall picture of how an organization's portfolio of knowledge stocks is managed' (Lepak and Snell 2008, p. 223) and differentiates between four central HRM systems (commitment, productivity, compliance and collaboration) to examine the characteristics specific HR architectures which enable exploration, exploitation, and ambidexterity in different environments. Each HRM system represents a certain configuration of key HRM practices such as job design, recruiting/selection, training, performance appraisal and compensation. Lepak and Snell (1999) suggest that in contrast to the assumption 'that there exists a single optimal HR architecture for managing all employees' (Lepak and Snell 1999, p. 32), the applied HRM practices should vary depending on the degree to which the human capital of different groups of employees is important for competitive advantage.

The HR architecture is divided into four distinct quadrants as a function of the value and uniqueness of the employees' human capital (Lepak and Snell 1999, 2002). Each quadrant combines a certain (a) HRM system, (b) with a specific employment mode and (c) a corresponding employment relationships. The *HRM systems* represent a certain configuration of key HRM practices and define the appropriate employment mode, constitute and maintain a specific employment relationship and facilitate the development of the employees' human capital. The different *employment modes* refer to the make-or-buy decision on the development of human capital (internalization vs. externalization of employment) Lepak and Snell (1999, 2002). Whereas the *employment relationship* (Rousseau, 1995) may "range from long-term relationships with core employees to short-term exchanges with external workers and other forms of contract labor" (Lepak and Snell, 2002, p. 519).

(1) The first quadrant represents '*knowledge-based employment*' for employees with highly valuable and unique knowledge. The HRM system for knowledge workers is *commitment-based* and facilitates the internal development of knowledge and an organization-focused employment relationships between the core employees and the organization. Referring to Lepak and Snell (2002), the job design for knowledge workers allows for changes of how the job is performed and empowers employees to make their own decisions. Related jobs are based on a wide task variety, regular job rotation and a high level of job security. Recruiting and selection are designed to find the 'best all around' job candidate and focus on the employees' potential to learn as well as on the ability to contribute to the firms goals and strategic objectives. Furthermore, the selection practices have an organization-internal focus and, therefore, 'emphasize promotion from within' (p. 527). The comprehensive and continuous training is long-term-oriented and seeks to develop the firm-specific skills and knowledge. The

organization invests extensive amounts of resources (time and money) in the training activities for their core knowledge workers. Performance appraisals focus on individual learning and are based on feedback from several sources such as peers and subordinates. Like the training activities, the performance appraisal is also orientated toward reaching the firm's strategic objectives and includes developmental feedback. The compensation and reward practices are also long-term orientated including extensive benefits packages (with e.g. stock ownership program) and includes incentives for the generation of new ideas.

(2) A 'job-based employment' characterizes the second quadrant which is based on a market- or *productivity-based HRM system* through which knowledge is acquired and employees with valuable but not unique knowledge are engaged in a symbiotic employment relationship. Characteristic for the productivity-based HRM system is that employees perform jobs that are standardized in their industry. In the comprehensive recruiting and selection process many job candidates are screened targeting different recruiting sources such as universities and agencies and using e. g. interviews and tests as selection methods. Training focuses on the job-experience for the improvement of current job performance and the increase in short-term productivity. Objective and quantifiable results build the basis of performance appraisals to measure productivity and efficiency operationalized through the assessment of the quality and quantity of employee outputs. Compensation and rewards are oriented at the market wage, are based on a straight salary and are supplemented with individual incentives and bonus components. Overall seniority is valued in the productivity-based HRM system.

(3) In the third quadrant the 'contractual work arrangements' a *compliance-based HRM system* is applied to contract employees without any valuable or unique knowledge based on a transactional employment relationships. Employees that hired on

a contract base perform jobs that are well-defined, simple and not including a narrow set of tasks. There is no extensive selection routine and training activities as well as performance appraisals focus on the compliance ‘with rules, regulations, and procedures’ (Lepak and Snell 2002, p. 527). The compensation is based on hourly pay and rewards focus on short-term performances.

(4) The fourth and last quadrant refers to ‘alliances or partnership’ (Lepak and Snell, 2002) and a *collaborative HRM system*. Very unique knowledge – which value to firm cannot be evaluated yet or is not directly instrumental in creating strategic value - is acquired through alliances with external parties who are involved in an employment relationships in the form of a partnership. These employees perform jobs which are designed around the specific skills of the individuals who are engaged in cross-functional teams and relational networks. Recruiting and selection practices focus on the experience and the industry knowledge of applicants and their ability for teamwork and collaboration. Correspondingly, the training activities support interpersonal relations and team building. The performance appraisals also focus on team performance and the team members’ ability to work with colleagues. Group-based incentives (e.g. profit sharing) form the core of the compensation practices and are complemented by bonuses related to industry experience.

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Based on the reasoning above, the four HRM systems contribute differently to deal with the different demands for flexibility and for innovation (figure 3). Commitment-based HRM configurations fulfill the requirements to keep pace with a high-velocity environment and to create radical innovation. However, even in such configurations, also components of the productivity and collaborative HR configurations are necessary complementarities (e. g. for senior managers and for those RandD activities, where organizations rely on external expertise). In contrast, where environments are more predictable and stable and the need for innovations concerns more incremental improvements, a compliance HR configuration is useful. Again, productivity and collaborative HRM configurations are necessary complementarities (e.g. for senior managers and for those activities that are only used temporarily such as consultants, who frequently optimize their business processes in order to remain efficient). In the next subsections, we discuss three typical HRM architectures (exploratory, exploitative, and ambidextrous), which contribute differently to keep pace with environmental dynamics.

### ***Exploratory HR Architectures in High-Velocity Environments***

Ten years ago, Yahoo and AOL dominated the internet and social media market with their business models and software technologies. In 2016, circumstances have changed: Now Google and Facebook are the market leaders. These companies introduced their services in the course of the last decade, that is, quite recently. This example shows that high-velocity markets, such as the internet and social media market, are characterized by a high level of dynamics and unpredictability. Firms operating in such markets constantly need to be aware of opportunities and threats. This demands a high level of

*exploration* that is based on flexible organizational design and even radical innovations (if possible). Companies face the pressure to adapt either to new markets or to new technological trends. Such organizations, however, may proactively influence the development of markets and technologies by introducing *revolutionary product innovations*. This requires employees to frequently modify their background knowledge, i.e. decision-making heuristics and cognitive schemata, in order to deal with new situations and expectations.

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In high-velocity markets, making timely decisions is essential to cope with emerging expectations, opportunities, or threats. Decentralized decision-making by experienced managers ensures rapid adaptation and quick solutions. In high-velocity environments a high level of exploratory learning enables flexibility through the constant exploratory development of a firm's knowledge base. For that reason firms with an exploratory HR architecture often follow a strategy of continuous change (Brown and Eisenhardt 1997). In practice, this means that they shape their decisions on adaptation and innovation in the form of simple rules that govern decision-making in loosely coupled decentralized units (Bingham and Eisenhardt, 2011, Bingham and Haleblan 2012, Eisenhardt and Martin 2000, Eisenhardt and Sull 2001). In this setting, an *exploratory HR architecture* combines knowledge-based employment and a commitment-based HRM system, on the one hand, with alliances and partnerships and a collaborative HRM system, on the other hand (figure 4). In order to maintain exploration, firms focus on core-knowledge employees that hold highly valuable and unique human capital. Knowledge workers—

such as engineers in high technology sectors—are central to a firm’s success and competitive advantage, so firms orientate the *employment mode* towards the skills and competencies of these employees and develop their human capital internally. The *long-term employment relationships* between these employees and the firm are organization-focused and relational. They are furthermore characterized by mutual investments and commitment between employer and employee (Lepak and Snell, 1999, 2002). Organization-focused employment relationships should be matched with the implementation of a *commitment-based* HRM system (Arthur, 1994) in which jobs are loosely defined and allow for change and adaptation in the work design.

Project-based organizational designs also enable firms to maintain a high level of flexibility in order to meet changing demands (Swart and Kinnie 2010). Staffing decisions are thereby based on the employees’ potential—for example their cognitive ability or aptitude. Staff induction is individualized, which allows older staff to use and even learn from the knowledge and experience of newly hired employees (Güttel, Konlechner, Kohlbacher and Haltmeyer 2009). Firms seek to develop firm-specific knowledge through extensive training and mentoring programs, as well as through developmental appraisals and skill-based and team-based pay systems. A commitment-based HRM system establishes the necessary context for a firm to perform exploration or exploitation, according to the judgment of employees and decentralized units. Loose structures enable the evolutionary development of social norms, which allow employees to adapt their behavior according to perceived environmental demands. Because in such settings employees tend to possess multifaceted knowledge and the level of resource flexibility is high, they are able to decide quickly and on lower levels which behavior is appropriate to address new demands. In particular, employees profit from extensive background knowledge as simple rules imply that they need to make decisions (quickly)



on their own as the organization lacks any detailed guidelines. When new situations disruptively emerge, employees need their broad knowledge to make decisions where simple organizational rules do only indicate strategic boundaries.

To promote the creation of knowledge, firms also utilize strategic alliances to facilitate the constant inflow of new employees with new knowledge. The *alliance-employment mode* represents ‘a hybrid that blends internalization and externalization’ and refers to long-term external partnerships ‘where each party contributes to a jointly shared outcome’ (Lepak and Snell 1999, p. 41). Examples of such relationships are the alliances an organization may form with a research laboratory, with legal or management consultants or with accounting firms. The human capital of external alliance partners is *idiosyncratic* (Lepak and Snell, 2008). However, although this knowledge is unique, it is not directly instrumental in a firm’s efforts to create strategic value, e.g. by utilizing the knowledge of an attorney or of a scientist who performs basic research. The mutual goal of the partners involved in such alliances is to create a co-specialized asset by providing customized services to the client firm. The *employment relationship* of a partnership is based on a paradox: on the one hand, the partners have to build up trust by mutually investing in the relationship. On the other hand, both parties will aim to protect their firm-specific knowledge. The HRM system that is employed in such alliances is *collaborative* and its HRM practices focus on the overall relationship, rather than on the development of individual human capital: such practices include cross functional teams and mentoring programs, which facilitate team-building and information-sharing and foster cooperative behavior and knowledge integration. These training activities are supported by appraisals of developmental performance as well as team-based reward systems (Lepak and Snell, 1999, 2002).

### ***Exploitative HR Architectures in Moderately Dynamic Environments***

In the automotive industry, during the last decade Toyota, General Motors, and Volkswagen have dominated the market. Similarly, McDonalds and Starbucks (restaurants), GE and Siemens (power plants), and Wal-Mart and Carrefour (retailers) have held the leading positions in their industries over many years. Although significant changes may take place from time to time, the *environmental dynamics* in these markets are *moderate* and—from a mid-term perspective—often predictable. Firms with an exploitative HRM architecture can profit either by exactly replicating their successful business models in new markets with similar conditions or by optimizing their business processes and structures to increase efficiency, quality or time-to-delivery. In firms such as McDonalds or Starbucks, the firm's competitive position is often based on the exact replication of the existing business model and its alignment with the embedded organizational routines (Friesl and Larty 2013, Winter and Szulanski 2001). Thus, on the whole employees can rely on their existing knowledge base as they have to follow standardized procedures, which are often codified and learned in extensive trainings.

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Exploitation in *moderately* dynamic environments is based on complex routines that secure alignment and knowledge exploitation. In moderately dynamic markets firms tend to have more time to gather information and to discuss alternative solutions, which leaves more room for centralized decision-making. In such settings, HRM architectures need to provide methods to increase efficiency (restructuring, business-process optimization), transferring best-practice solutions and processes internally (Szulanski

1996) or into a new market (replication; Friesl and Larty 2013), and facilitating incremental innovations. Knowledge development in form of exploratory innovation and substantial reconfiguration is rare, however, and when it does take place it is primarily governed from the top. Moderately dynamic environments change at a slower pace, so exploratory activities at the top and at the employee level are rarely necessary. By contrast, because the continuous replication of the firm's existing business model is the basis for success, the existing core capabilities have to be exploited (Szulanski and Jensen 2006). What's more, it has been pointed out that too much exploration might harm successful exploitation (Siggelkow and Rivkin 2006).

In view of this, *exploitative HR architecture* combines contractual work arrangements and a *compliance-based* HRM system with job-based employment, a *productivity-based* HRM system and some elements of the collaborative HRM system (figure 5). The human capital of contract workers represents *ancillary knowledge* (Lepak and Snell 2008), which is neither specific nor highly valuable to the firm, given that organizational rules and routines provide adequate knowledge to employees for their operative activities. For administrative or lower-level jobs that require e.g. clerical or supporting staff, firms can hire or lease short-term, temporary workers. 'Transactional' (Rousseau 1995) employment relationships consist in an economic and short-term exchange between employer and employee with a low level of mutual involvement and commitment. The firm relies primarily on a *compliance-based HRM system* (Lepak and Snell 1999, 2002) that enables *coordination flexibility* and is based on the implementation of explicit rules and procedures to ensure that the employees' behavior conforms to the contract and to organizational standards. Often simple individual decision-making heuristics fit well to complex organizational routines and rule-systems as the employee's contribution is clearly specified.

Characteristic practices in the compliance-based HRM system include standardized tasks and narrow job design, hourly wages, job-based performance appraisals and limited training. Clearly defined aims and template-based guidelines provide a framework for precisely controlling employee performance. Tightly specialized tasks and exploitative (repetitive) behavior expectations require an incentive system embedded in a management-by-objective (MbO) reward system that addresses extrinsic motivation. Formal mechanisms orientate the replication of HRM practices by aligning formal rule systems and template-based processes. Thus, the variability of employee behavior is constrained and deviations from the formal set of rules are punished. The firm can develop new skills at the employee level either by selecting new employees from outside the firm or by introducing novel skills through off-the-job training. In that way the firm narrowly defines learning topics and task-specific requirements for new employees.

In contrast, organizations that operate in moderately dynamic markets with employees whose skill base is highly developed, such as pilots, judges, civil servants, or surgeons, have to implement structures that prevent their highly skilled employees from exploration (Siggelkow and Rivkin 2006). Despite their high level of knowledge, employees have to stick tightly to existing routines and standard operating procedures, otherwise the organization runs a high risk of drifting into chaos. In such cases, complex sets of strategic routines governed by the center of the organization exactly specify the mode of how operative routines can be changed (e. g. business-process optimization projects based on explicit guidelines specified by internal or external consultants).

The procedure of how the activities of the operative basis are to be altered (which may concern business processes or structures) is usually determined at the top of the organization. To go back to the earlier example, neither judges nor civil servants nor

pilots are allowed to change formally defined standard operating procedures. Although judges and civil servants may have the scope to re-design administrative procedures or laws, they can only do so by following specific legal procedures (e. g. legislation amendments have to be approved by the parliament). As a result, the democratic and rational constitution of society achieves stability and is independent of spontaneous individual decisions. Similarly, pilots cannot change procedures in ‘mid-air’. Instead, the risks and consequences of any proposed change must be thoroughly checked through centralized and complex procedures so that airlines can ensure the highest reliability in their operations (Weick, Sutcliffe and Obstfeld 1999).

In moderately dynamic markets organizations rely also on *job-based* employment and *productivity-based* HRM systems (Lepak and Snell 1999, 2002) to prevent the continuous—and, from the perspective of the top management, unplanned—evolution of organizational routines and practices. While job-based employees need to possess specific skills, their human capital represent *compulsory* knowledge (Lepak and Snell, 2008) which is strategically valuable to the firm but not unique; certified public accountants (CPAs) with standardized accounting skills are an example of such employees. Because the required human capital is available in the external labor market, in such settings firms do not need to develop it internally. To internalize employment, they rely on the acquisition of human capital for specific jobs. In these cases the employment relationship is *symbiotic*, in the sense that it is maintained as long as both employer and employee benefit mutually from it. Such employees are less committed to a specific firm than knowledge workers and much more oriented towards their own careers and professions. To identify employees who are able to immediately perform specific tasks, *productivity-based* HRM systems rely on selective hiring through achievement-testing and job-based staffing, rather than on extensive training and

development. Employees are viewed as valuable contributors and are paid market-equivalent wages with a result-oriented component and are required to focus their attention primarily on issues of productivity (Lepak and Snell 1999, 2002). In addition, some innovation and reconfiguration activities are even in a moderately dynamic environment necessary to keep pace with the competitive landscape. Thus, alliances and partnerships to complete specific tasks such as business process optimization, the introduction of new ICT systems or the entrance into new markets are of temporal nature and require a collaborative HRM system.

### ***Ambidextrous HR Architectures in Heterogeneous Environments***

Companies such as IBM, Google, or Baxter are embedded in environments where both stability and radical innovation co-evolve continuously. Furthermore, multinational corporations increase their adaptive capabilities due to environmental demands (Li and Liu 2014; Zhou, Zhang and Liu 2012). Such environments require structurally ambidextrous HR architectures that allow organizations to become stabilized and, at the same time, to profit both from existing knowledge and from even radical innovations. In firms that operate in such settings, competing and sometimes paradoxical logics may co-exist (Smith and Lewis 2011). This is because in some areas, such as production and sales, stability and predictability are essential, whereas in other areas, such as RandD and small and semi-independent ventures and projects (e. g. for the exploration of new market opportunities and technologies), adaptability and contextual freedom for developing even radical innovations are necessary (O'Reilly et al., 2009). Thus, decision-making heuristics and cognitive schemata differ between exploitative and exploratory domains.

Both the top-management team and the strategy and HRM system of such firms need to maintain the differentiation between exploration and exploitation (Smith and Tushman 2005). At the same time, however, they need to consistently integrate the different logics in order to enable knowledge transfer between the two domains and to strategically align the entire company. In highly dynamic environments, where most employees (e. g. in marketing, sales, production plants, or outlets) do not have the necessary knowledge and skills to explore new opportunities (e. g. in RandD) that support the firm's strategy, firms need to achieve ambidexterity (Gilbert 2006, Tushman and O'Reilly 1996).

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Structurally ambidextrous HR architectures ensure the balance between exploration and exploitative as well as an orchestrated knowledge transmission between exploration and exploitation (Kang and Snell 2009, Kang et al. 2007). On the one hand, they have to meet the challenge of developing cutting-edge knowledge in their RandD units, whose sole task is to explore new opportunities; on the other hand, however, they must ensure that all other units remain stable so that they can exploit existing knowledge. Thus, in such organizations HRM systems facilitate the creation and development of knowledge in exploratory units and, at the same time, they limit change and development in exploitative units in order to use existing capabilities in the most effective way. In other words, structurally ambidextrous HR architectures rely on three HRM systems concurrently as a commitment-based HRM system with some additional components of a collaborative HRM system facilitates the creation of radical innovations and enables a

high-level of flexibility on the one hand. On the other hand, the compliance HRM system with some minor components of a productivity HRM system allows a highly efficient performance of the exploratory domains. Consequently, firms need to establish RandD units that explore radical new opportunities following the logic of a commitment-based HRM system and a collaboration-based HRM system to - often temporarily - support the creation of radical innovations. Organizational units, however, which are dedicated to exploiting existing knowledge and capabilities, should follow the logic of a compliance-based HRM system for lower level jobs and, if needed, a productivity-based HRM system for higher level jobs. The top-management team has the task of integrating both modes with different logic and of finding ways to balance tensions (Smith and Tushman 2005). Therefore, the main HRM challenge is the creation of a meta-level HRM capacity to create a highly differentiated HR architecture, on the one hand, that enables, knowledge transfer, and knowledge integration, collaboration, on the other hand. Garaus et al. (2015) highlight integrative employment practices for social integration (e.g. overall identification, shared understanding) and integrative work practices for formal integration (e.g. room for exchange and coordination, interfaces) for enabling collaboration, which in turn creates a common frame of reference that facilitates bridging exploration and exploitation in ambidextrous organizations.

Since knowledge transfer and knowledge integration are highly critical as there is a constant need for adaptation and incremental innovation due to the fact that the organization is embedded in both a high-velocity environment and a moderately dynamic environment, a contextually ambidextrous HR architecture is useful. Firms in such environments often need to combine exploratory activities (e.g. research) for some markets and exploitative activities (e.g. development) for other markets (Güttel and Konlechner 2009). Consulting firms such as McKinsey and Boston Consulting Group



often apply standardized solutions (exploitation) while they explore new market trends and create new methods for future consulting projects (exploration). Similarly, architectural offices such as Coop Himmelblau also perform in some cultural-based projects exploration while they replicate standardized solutions for conventional buildings.

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*Contextually ambidextrous HR architectures* concurrently employ *commitment-based* and *productivity-based* HRM systems (figure 7). A commitment-based work system is advantageous in exploratory domains, whereas a productivity-based HRM system is more appropriate for exploitative domains. Balancing exploration and exploitation in a contextually ambidextrous HR architecture means that firms need to find appropriate HR practices to design the interfaces: differentiating between exploration and exploitation and integrating these heterogeneous knowledge streams concurrently. Employees at these critical interfaces need broad background knowledge and a common frame of reference to understand both learning modes and to connect knowledge from both of these domains (Fillipini, Güttel, Nosella and 2012, Güttel, Konlechner, Müller, Trede and Lehrer 2012, Kang et al. 2007). Therefore, HR practices facilitate the employees' ability to deal with diversity resulting from heterogeneous learning domains at the interfaces. Furthermore, firms may apply performance management systems (e. g. MbO) at those interfaces where commitment-based HRM systems and productivity-based HRM systems collide to draw the employees' attention either towards exploration or exploitation (Güttel and Konlechner 2009).

Contextually ambidextrous HR architectures for different learning modes may therefore be complimented by specific organizational capital types: the commitment-based HRM system may be complemented by mechanistic organizational capital such as an error-avoiding control systems and the productivity-based HRM system may be complemented by an organic organizational capital type in form of an error-embracing control system (Kang and Snell 2009). Contextually ambidextrous HR architectures can temporarily integrate collaborative HRM systems for those employees who contribute with highly specific knowledge for certain extraordinary tasks (e. g. specialists for specific consulting projects such as technicians, lawyers, or software engineers).

## **Discussion and Conclusion**

In the HRM literature there is an increasing awareness of the role of HRM systems as antecedents of organizational ambidexterity (e. g. Glaister et al. 2015, Junni et al. 2015). In line with this stream of research, we investigated how, on the one hand, different HR architectures combine different HRM systems—based on commitment, productivity, compliance, and collaboration—to foster flexibility and, on the other hand, enable innovation in different dynamic environments. We contribute to current HRM research in the following three ways: *First*, we explain how different HR architectures, as specific configurations of HRM systems with embedded HRM practices, facilitate exploitation, exploration and (structural and contextual) ambidexterity in order to respond to different dynamic environments. Hitherto, ambidexterity literature is not fully differentiated under which environmental conditions different HR architectures are useful and how specific HRM systems and practices contribute to exploration and exploitation respectively. We thus add to the handful of papers that address this topic. Previous work has discussed how different HRM systems shape different organizational

capabilities and learning (e. g. Hansen and Alewell 20013, Kang and Snell 2009, Prieto and Pérez Santana 2012). Other studies have focused on specific forms of ambidexterity when they discuss the configuration of HRM systems (Huang and Kim 2013, Patel et al. 2013 Ahammad et al. 2015, Kostopoulos et al. 2015) or how HRM systems act as interfaces between exploration and exploitation (Garaus et al., 2015).

As previously noted, with our overall theoretical framework we substantially contribute to the few recent studies that highlight the role of HRM for environmental dynamics (e. g. Nijssen and Paauwe 2012) and the importance of the implementation of an appropriate HRM system in an increasingly turbulent and unpredictable environment (Huang and Kim, 2013). This research has shown that high-involvement work practices can create environmental capabilities and environmentally based sustainable competitive advantages (Martínez-Del-Río et al. 2012) or have illustrated how firms build dynamic strategic capabilities based on strategic human capital management to cope with rapidly changing environments (Wang et al. 2012). As a result, more recent studies have focused on the role of the top management team in facilitating behavioral integration to cope with environmental dynamism (e. g. Halevi et al. 2015).

Considering this previous research, we take the discussion a step further and systematically explain how HR architectures, enable exploration, exploitation, and ambidexterity in order to facilitate the organization's ability to face different environmental challenges. Our paper serves as a linking pin between the discourse of exploration, exploitation, and ambidexterity and literature on HR architectures as we systematically explain how different HR architectures enable organizations to select an appropriate balance between alignment and adaptability and flexibility and efficiency respectively (table 1).

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*Second*, we advance Lepak and Snell's model of the HR architecture (1999, 2002) by integrating the dimension of environmental dynamics to explain how differently designed HRM systems can help govern the pace of a firm's adaptation to environments with different dynamics. The original concept of HR architecture does not explain how knowledge flows are managed within and across different employment modes and employee groups (Lepak and Snell 2008, p. 223), while the extended concept of HR architecture by Kang, Morris, and Snell (2007) does not connect their findings to environmental dynamism. Kang et al. (2007) explain how organizations renew their stock of knowledge by managing specific knowledge flows within the HR architecture with the help of specific HR practices. However, the strategic drivers behind the different archetypes have not been identified hitherto. Here we expand on Lepak and Snell's internal perspective of the firm's HR architecture, as well as on Kang and Snell's distinction (2009) between two types of intellectual capital architecture that facilitate ambidextrous learning. Furthermore, we discuss how external dynamics influence the HR architecture in order to balance the appropriate level of fit and flexibility (Wright and Snell 1998). In addition to Kang and Snell (2009), who highlight the notion of supplementary and complementary fit between parts of the intellectual capital architecture that facilitates ambidextrous learning, we argue that HRM systems also serve as balancing mechanisms that moderate the degree of adaptation in different domains. We furthermore show how firms achieve a balance between fit and flexibility by using differently shaped HRM systems to develop their capacity for adaptation either

by means of structural ambidexterity or contextual ambidexterity through highly skilled employees who are able to respond in an ad-hoc mode to environmental demands (e. g. Turner et al. 2013). We, therefore, extend the internal perspective of the HR architectures, which focuses primarily on organizational resources, by considering the organization's environment as a central determinant of a firm's survival and success (figure 8). Temporal cycling (Simsek et al. 2009) as a specific form of ambidexterity, which implies a substantial change of the balance between exploration and exploitation, therefore requires an extensive modification of the HR architecture (e g. shifting emphasize from a compliance-based HRM system to a commitment-based HRM system).

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*Third*, we indicate the need for internally differentiated HR architectures for those firms in which heterogeneous demands for efficiency and radical innovation co-exist, which is typical for some ambidextrous firms (Nosella et al. 2012, O'Reilly and Tushman 1996, Raisch and Birkinshaw 2008). Lepak and Snell (2008) and Lepak et al. (2003) discuss the general configuration of HR architectures to achieve either flexibility (adaptability) or fit (alignment). However, they do not shift attention to those HR architectures that reconfigure the firm's resource base or stimulate innovation. Consequently, their work also does not address the issue as to how HR architectures contribute to maintaining exploration, exploitation, or ambidexterity to keep pace with different environmental demands. In this way, we respond to Lepak and Shaw's call (2008) for further research on internally differentiated HR architectures, which are in

particular necessary to achieve ambidexterity. While the concept of HR architecture draws an ‘overall picture of how an organization’s portfolio of knowledge stocks is managed’, it does not account for how to promote knowledge flow within and across different employment modes’ (Lepak and Snell 2008, p. 223). Ambidextrous HR architectures allow firms to employ exploration and exploitation concurrently in order to meet contradictory environmental demands and different organizational needs for fit and flexibility

Our research also has *managerial implications*: Firms, HR staff and managers can refine their HRM practices and align them with the strategic demands to keep pace with environmental dynamics. Our conceptual model reveals how exploratory, exploitative, and ambidextrous HR architectures configure specific HRM systems and practices to find a strategically appropriate balance between exploration and exploitation (figure 9).

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In particular, with reference to the global economic context, firms need to be aware of their current and future challenges in order to invest carefully in the creation of robust HR architecture. In some industries, the alignment of business processes and the superior replication of existing practices may create cost advantages that allow firms to deal with an increasing cost pressure due to a decreasing demand and an intensive competition from emerging economies. Such firms require a high level of exploitation to optimize their business processes, to facilitate the internal replication of best practices to enhance efficiency and create incremental innovations. Exploitative HR architectures

primarily based on compliance-based HRM systems serve as a means to meet efficiency demands and to govern knowledge transfer and stage-gate product innovation processes. In other markets, the investment in future technologies and the creation of new business models may lead to a superior strategic position. Therefore, exploration needs to facilitate the constant creation of novelties to be ahead of competitors. HR architectures primarily based on commitment-based HRM systems have to deliberately create a space for nurturing radical innovations and to enhance adaptability by a broadly skilled workforce, where employees are able to make decisions on their own in situations where organizational rules just indicate strategic boundaries. Finally, in those markets, where efficiency and radical innovations are concurrently necessary to be competitive, firms need ambidextrous HR architectures to connect exploitative and exploratory domains. Thus, such firms have to draw on different dominant HRM systems concurrently. If firms need to combine efficiency in some markets with flexibility and radical innovations in other markets, they have to establish an internal differentiated HR architecture that combines compliance-based, commitment-based, and collaboration-based HRM systems to facilitate both exploitation and exploration. Structurally ambidextrous HR architectures exactly rely on the use of these different HRM systems in order to create a strategic balance between exploration and exploitation necessary to meet heterogeneous environmental demands. If flexibility and continuous incremental improvements of processes and products are a strategic demand, contextually ambidextrous HR architectures provide a tight coupling between exploration and exploitation. Contextually ambidextrous HR architectures rely on the combination of commitment-based and productivity-based HRM systems in which employees, embedded in exploratory and exploitative projects, alternate between exploration and exploitation. In both the contextually and the structurally ambidextrous HR architecture,

embedded HRM practices (e.g. induction programs, cross-functional teams, project structures) serve as a means to establish knowledge bridges between exploratory and exploitative domains and to create a common frame of reference to maintain ambidexterity.

Importantly, the way in which various HRM systems and practices enable firms to develop the most appropriate HR architecture in different dynamic environments is a vibrant topic that should be investigated empirically by future research. In particular, how firms respond to environmental demands by adopting ambidextrous HR architectures and differentiating their HRM systems according to the strategic needs through compensation systems, induction programs, performance appraisals, training and development are important fields for empirical research.

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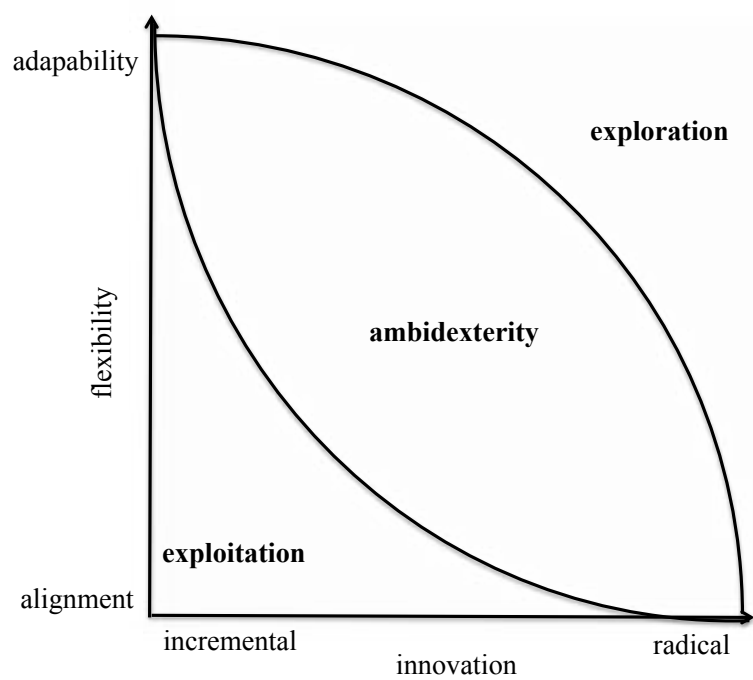
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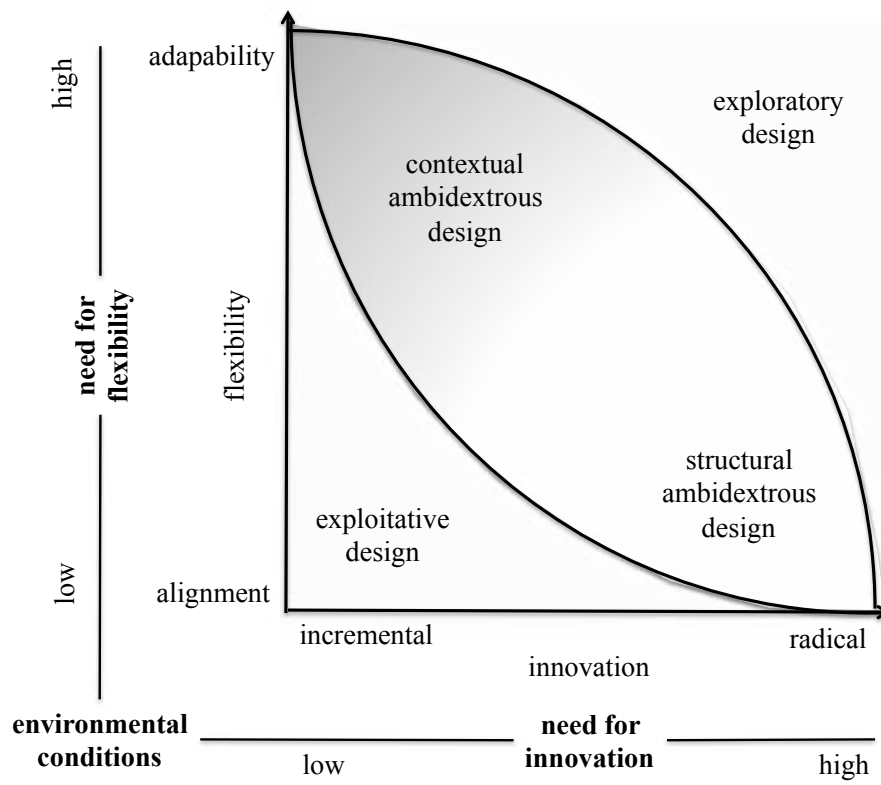
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**Figure 1: Exploration, Exploitation, and Ambidexterity**



**Figure 2: Exploratory, Exploitative, and Ambidextrous Designs for Different Environmental Conditions**



**Figure 3: HRM Configurations and the Need for Flexibility and Innovation**

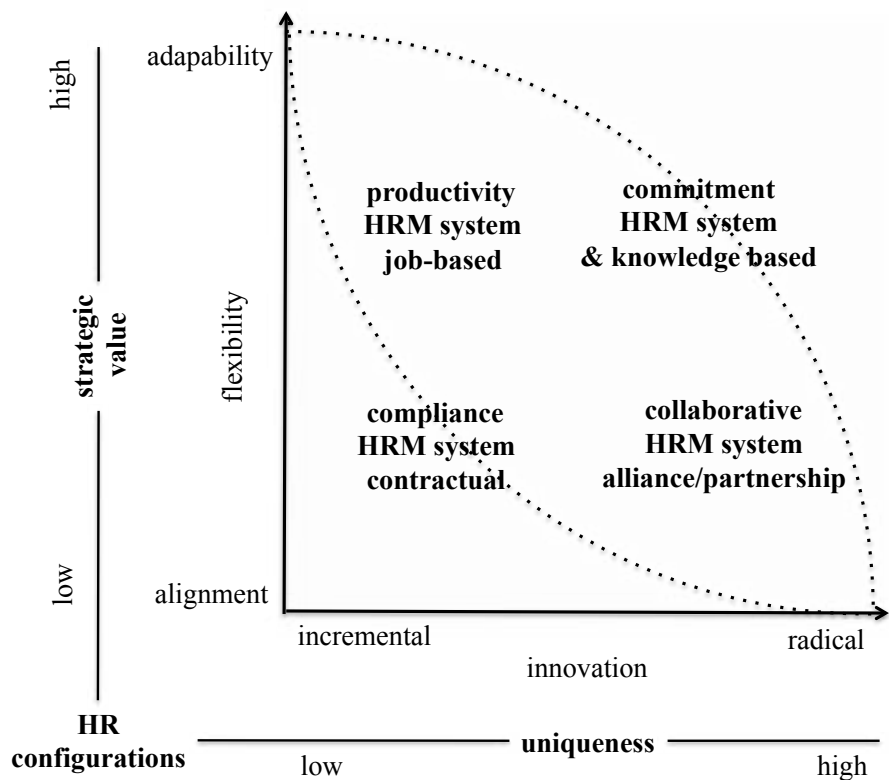


Figure 4: Exploratory HR Architecture

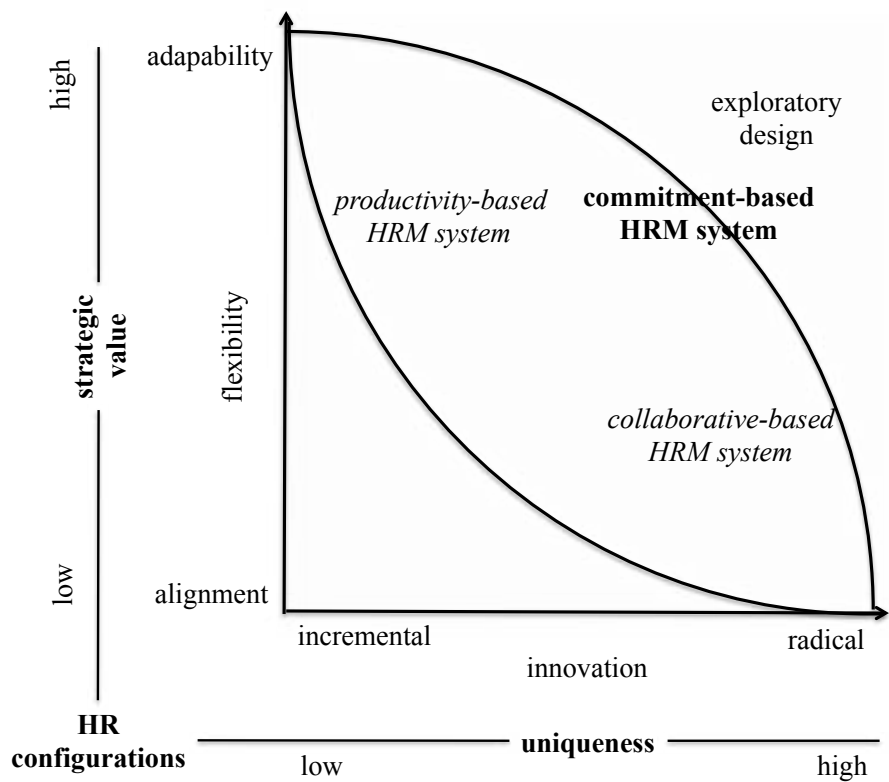


Figure 5: Exploitative HR Architecture

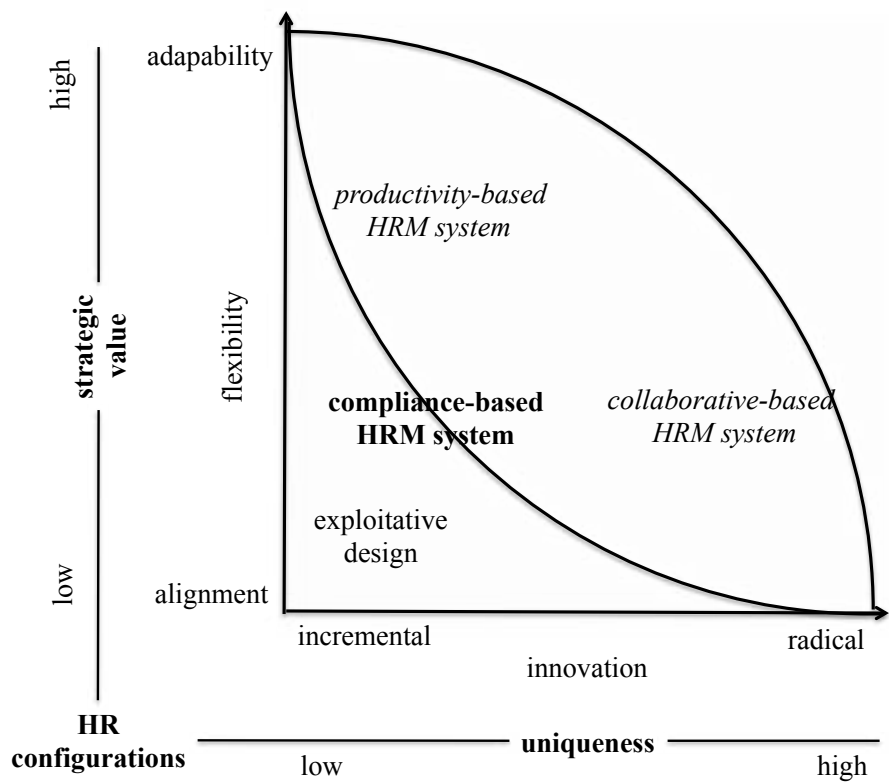


Figure 6: Structurally Ambidextrous HR Architecture

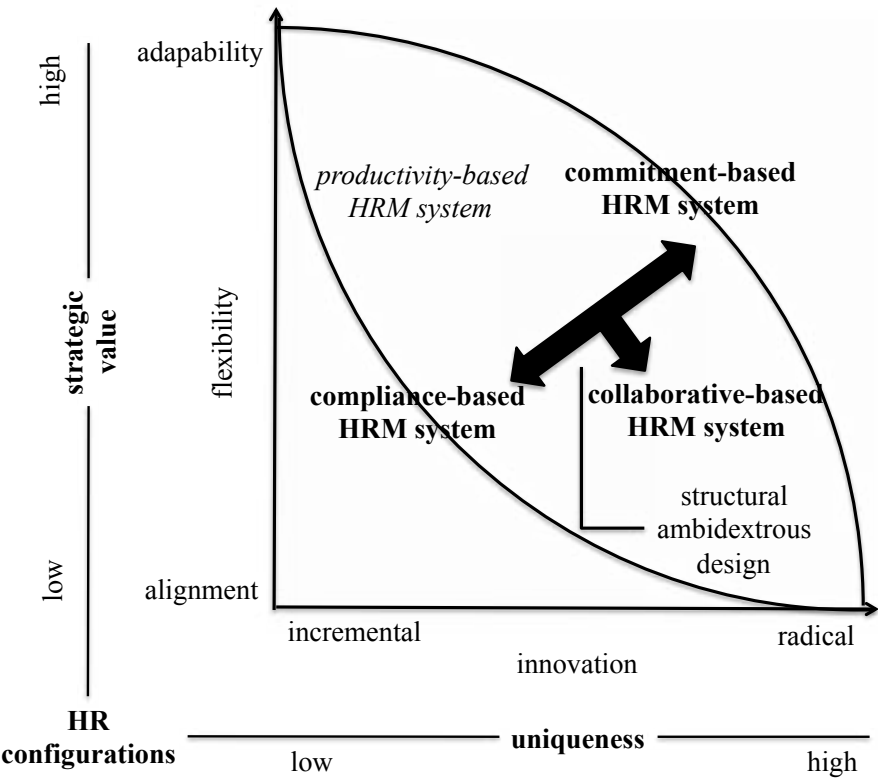




Figure 7: Contextually Ambidextrous HR Architecture

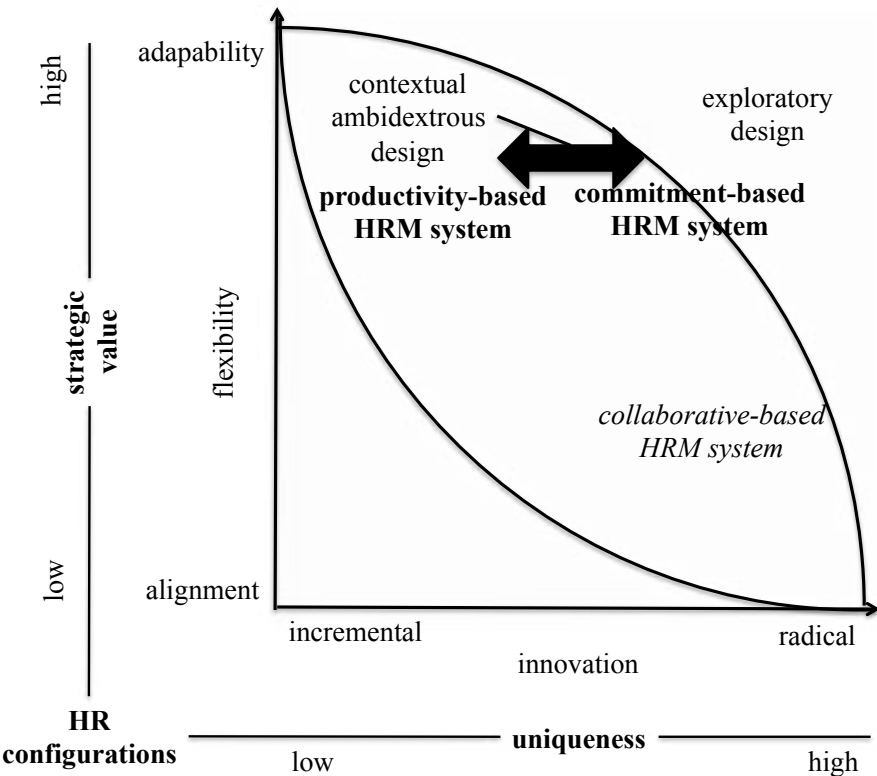
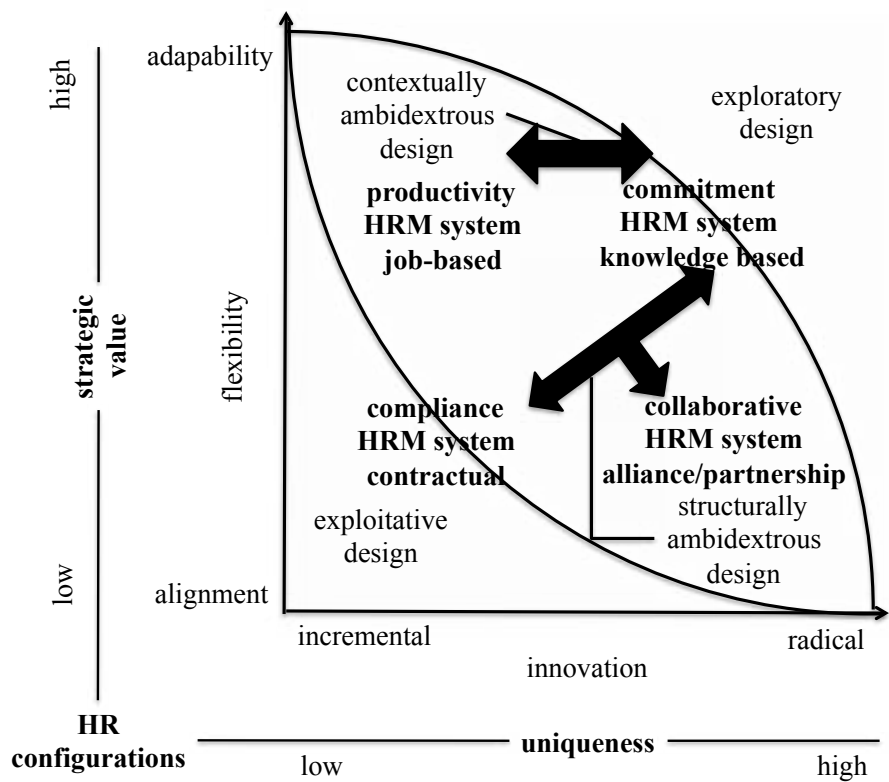
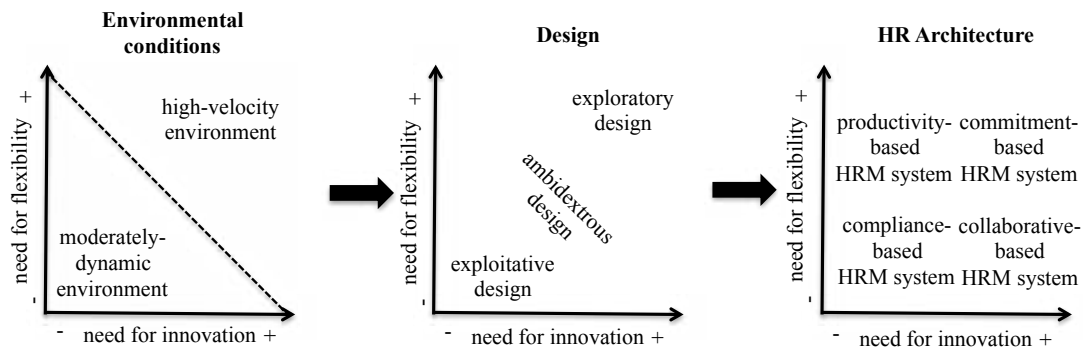


Figure 8: Ambidextrous HR Architectures



**Figure 9: Environment-Design-HR Architecture Portfolio**



**Table 1: HR Architectures in Different Dynamic Environments**

	<b>Exploratory HR Architectures</b>	<b>Ambidextrous HR Architectures</b>	<b>Exploitative HR Architectures</b>
<b>Environmental Dynamics</b>	High-velocity environments	Different dynamic environments	Moderately dynamic environments
<b>Development Mode</b>	Explorative Facilitating adaptability and radical innovation	Ambidextrous Balancing alignment and adaptability as well as incremental and radical innovation	Exploitative Enforcing alignment and incremental innovation
<b>HRM Systems</b>	Commitment-based HRM system complemented by collaborative-based HRM system and productivity-based HRM system	Internal differentiated HRM architectures	Compliance-based HRM system complemented by productivity-based HRM system and collaborative-based HRM system
		<i>Structural Ambidexterity:</i> Commitment-based HRM system, compliance-based HRM system, collaborative-based HRM system complemented by productivity-based HRM system	
		<i>Contextual ambidexterity:</i> Commitment-based HRM system and productivity-based HRM system complemented by collaborative-based HRM system	